

EXHIBIT 84
FILED UNDER SEAL

UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF CALIFORNIA
SAN FRANCISCO DIVISION

WAYMO LLC,)
Plaintiff,)
vs.) Case No.:
UBER TECHNOLOGIES, INC.,) 3:17-cv-00939-WHA
OTTOMOTTO LLC; OTTO TRUCKING)
LLC,)
Defendants.)
_____)

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VIDEOTAPED DEPOSITION OF MICHAEL LEBBY

San Francisco, California

Monday, April 17, 2017

Volume 1

Reported by:

RACHEL FERRIER, CSR No. 6948

Job No. 2596388

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1 A That is correct. 01:44:38	1 a fashion where there is [REDACTED] of the boards 01:47:56
2 Q So that's not something you considered as part of 01:44:39	2 and [REDACTED] of the boards. 01:47:59
3 your declaration? 01:44:44	3 Q And that's the same for each cavity; correct? 01:48:02
4 A That is correct. I did not consider that. 01:44:45	4 A Yes. So for the long-range cavity, a similar 01:48:07
5 Q Turning to paragraph 30 of your declaration, 01:44:47	5 situation occurs where there are [REDACTED] lasers, and the 01:48:10
6 Exhibit 30, here your declaration is discussing -- 01:45:03	6 lasers are distributed. 01:48:14
7 discussing Waymo trade secrets that you characterize as 01:45:16	7 I believe, in this case, [REDACTED] 01:48:18
8 the "six-board arrangement"; is that fair? 01:45:19	8 [REDACTED] if I 01:48:22
9 A Yeah, in line 13, I characterize Way's -- Waymo's 01:45:21	9 remember correctly. 01:48:27
10 system as [REDACTED] Yes, that's 01:45:27	10 Q So, again, the Fuji device, overall [REDACTED] total 01:48:27
11 correct. 01:45:30	11 lasers? 01:48:31
12 Q You understand that what you have characterized 01:45:30	12 A If you add the two cavities together, [REDACTED] lasers 01:48:32
13 as [REDACTED] covers two distinct trade 01:45:32	13 per cavity, the Fuji device has [REDACTED] lasers. 01:48:38
14 secrets from Waymo's trade secret list; correct? 01:45:35	14 Q You agree the design files for the transmit 01:48:42
15 A I've written on line 10, that covers created 01:45:38	15 boards in the Fuji system are labeled [REDACTED] 01:48:51
16 Secrets No. 2 and 3. 01:45:42	16 correct? 01:48:53
17 I believe that's the one you are talking about; 01:45:49	17 A Yeah. 01:48:53
18 right? 01:45:52	18 If you take the medium-range cavity, you will 01:48:57
19 Q Correct. 01:45:52	19 find that the -- the boards -- and I'm looking at 01:49:00
20 Is it your opinion that both Trade Secret Nos. 2 01:45:54	20 page 7, paragraph 25 of my declaration. You will see 01:49:04
21 and 3 are directed to [REDACTED] 01:45:56	21 boards labeled [REDACTED] for the medium-range cavity, 01:49:08
22 [REDACTED] 01:45:59	22 and they are labeled [REDACTED] for the long-range 01:49:11
23 [REDACTED] 01:46:02	23 cavity. 01:49:14
24 [REDACTED] 01:46:06	24 Q They are not labeled [REDACTED] and then [REDACTED] 01:49:14
25 A I don't recall exactly what's written in the 01:46:07	25 again; correct? 01:49:18
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1 Trade Secrets 2 or 3, but given that I've written it 01:46:09	1 A They are labeled [REDACTED] for medium range and [REDACTED], 01:49:19
2 down in my declaration, that's my understanding. 01:46:13	2 [REDACTED] for long-range. 01:49:23
3 Q You agree that the Fuji device has 64 laser 01:46:15	3 Q Okay. Other than the Fuji device, is the only 01:49:23
4 diodes on [REDACTED] transmit boards; is that fair? 01:46:29	4 other LiDAR device that you considered in connection 01:49:32
5 A The Fuji device is a different device. It has 01:46:33	5 with your declaration -- strike that. 01:49:35
6 [REDACTED] boards per cavity. It has two cavities. So the 01:46:37	6 Other than the Fuji device, is the only other 01:49:39
7 Fuji device is -- is different compared to the Waymo 01:46:41	7 LiDAR device with [REDACTED] that 01:49:42
8 device. [REDACTED]. Fuji is 01:46:45	8 you considered in connection with your declaration the 01:49:51
9 composed of two cavities, each cavity having [REDACTED] 01:46:49	9 Waymo GBR3 device? 01:49:53
10 boards. 01:46:53	10 MR. MUINO: Objection to the form of the 01:50:04
11 Q Looking at the Fuji device overall, you agree 01:46:53	11 question. 01:50:05
12 there's [REDACTED] transmit boards? 01:46:56	12 THE WITNESS: Could you restate the question a 01:50:06
13 A The Fuji device has [REDACTED] boards for medium-range 01:47:02	13 different way? 01:50:08
14 cavity and [REDACTED] boards for a long-range cavity. If you 01:47:09	14 MR. NEWTON: Sure. 01:50:09
15 want to sum the number of boards together, there are [REDACTED] 01:47:12	15 Q Other than GBR3 and the Fuji device, your 01:50:09
16 boards, but there are two cavities and has two different 01:47:16	16 declaration does not identify any other LiDAR systems 01:50:12
17 designs, and each cavity has [REDACTED] boards, so the way I 01:47:21	17 that [REDACTED] 01:50:14
18 look at this is [REDACTED] boards per cavity. 01:47:24	18 [REDACTED] 01:50:19
19 Q Each of those [REDACTED] boards has [REDACTED] laser 01:47:27	19 A I believe the answer is correct. I didn't see 01:50:20
20 diodes; correct, in the Fuji device? 01:47:35	20 other [REDACTED]-channel units that had [REDACTED] 01:50:22
21 A The Fuji device, if you are talking about one 01:47:37	21 [REDACTED]. 01:50:28
22 cavity, one cavity -- let's take the medium-range cavity 01:47:43	22 Q If you look at paragraph 31, the Velodyne HDL 64 01:50:32
23 has [REDACTED] boards. On the [REDACTED] boards, we have a total 01:47:48	23 LiDAR system, this is one of the ones you considered as 01:50:37
24 of [REDACTED] lasers. 01:47:50	24 part of your declaration? 01:50:40
25 My understanding is the lasers are distributed in 01:47:52	25 A It is my understanding that the Velodyne has 64 01:50:41
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1 channels -- or let's say it's 64 lasers. 01:50:52	1 PCBs was limited by well-known design considerations for 01:53:59
2 Q And in the Velodyne system, each of those 64 01:50:58	2 automotive LiDARs 01:54:00
3 lasers is on its own transmit PCB; is that correct? 01:51:04	3 Do you see that? 01:54:01
4 A I don't know the actual layout of the Velodyne 01:51:07	4 A I do see that 01:54:02
5 system other than what I've seen in the '190 patent, 01:51:11	5 Q Do you know when Waymo first decided to develop a 01:54:03
6 which is the Velodyne patent, and -- in the '190 patent, 01:51:15	6 64-laser LiDAR system? 01:54:07
7 there are 32 transmit boards and 32 receive boards. The 01:51:19	7 A It may have been in some of the documents I've 01:54:08
8 patent discusses one laser per board, but it also 01:51:27	8 read, but I don't recall any dates to give you an answer 01:54:27
9 discusses a potential for two lasers per board, so I 01:51:30	9 to that question 01:54:30
10 don't know if the '190 patent is related to the HDL 64 01:51:33	10 Q Does [REDACTED] sound approximately right? 01:54:31
11 or not. 01:51:37	11 A I probably need to look at the documents I 01:54:35
12 Q Okay. Fair enough. 01:51:37	12 don't recall that level of detail 01:54:40
13 You agree that one possible arrangement of the 01:51:41	13 Q Okay So assuming it would be [REDACTED] what 01:54:41
14 LiDAR device with 64 lasers is one laser per board? 01:51:44	14 I want to get at is that your declaration mentions 01:54:49
15 A Yeah. Hypothetically, yes, you could have 64 01:51:48	15 this -- this point where Waymo had decided to develop a 01:54:52
16 lasers, each having one laser per board. Yes, that is 01:51:51	16 64-laser LiDAR; is that correct? 01:54:55
17 one hypothetical situation. 01:51:56	17 A I certainly mentioned, on line 24 on page 8, that 01:54:57
18 Q And another one would be 21 or 22 laser diodes on 01:51:58	18 Waymo decided to develop a 64-laser LiDAR, yes 01:55:04
19 three boards? 01:52:03	19 Q Okay And regardless of whether that was [REDACTED] 01:55:07
20 A Yeah. That is another configuration that is 01:52:04	20 [REDACTED], or another time, your declaration doesn't cite any 01:55:12
21 possible too, yes. 01:52:15	21 independent evidence to show that there were well-known 01:55:16
22 Q Another configuration is 16 laser diodes on four 01:52:16	22 design considerations for automotive LiDARs at that 01:55:18
23 boards? 01:52:21	23 time; is that fair? 01:55:21
24 A Yeah. There is -- there are a number of 01:52:24	24 A Well, considerations for LiDARs are -- as far as 01:55:23
25 different ways you can break up 64 lasers. As you say, 01:52:30	25 I can tell, from reading the documents I've seen, you 01:55:33
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1 you could have 64 lasers on 64 boards at one extreme, 01:52:35	1 know, one of the industry-leading LiDARs at the time was 01:55:38
2 and the other extreme, you could have one board with 64 01:52:39	2 the Velodyne, and the Velodyne, as we said earlier, had 01:55:40
3 lasers on it. 01:52:42	3 one laser per board The '190 patent shows 32 boards on 01:55:44
4 Both of those situations are, from my standpoint, 01:52:43	4 one side for the laser and 32 boards on the other side 01:55:50
5 problematic from an engineering perspective, and there 01:52:49	5 for the photodetector It's my understanding that the 01:55:53
6 are certainly other configurations that you just 01:52:52	6 alignment of the boards was actually difficult and 01:55:55
7 mentioned. 01:52:55	7 time-consuming 01:55:59
8 Q Would you agree that an eight-by-eight 01:52:55	8 And so I don't know the details of the design 01:56:00
9 arrangement would be less problematic from an 01:52:57	9 team's work here, but certainly from my perspective, you 01:56:05
10 engineering standpoint? 01:53:00	10 would want to look for easier ways to align the 01:56:09
11 A I haven't seen all the engineering parameters. 01:53:01	11 channels 01:56:12
12 You know, when you are designing an engineering 01:53:08	12 Q Okay And you didn't cite the Velodyne patent as 01:56:13
13 system, it's not just the number of boards or the optics 01:53:10	13 a specific example of a well-known design consideration 01:56:20
14 or the lasers or the photodetectors. You have to look 01:53:13	14 for automotive LiDAR? 01:56:24
15 at the cost of the unit, and you have to look at the 01:53:16	15 A It's not cited in paragraph 32, but I believe it 01:56:25
16 size considerations, and you also have to look at things 01:53:18	16 may be cited elsewhere I've actually cited it in 01:56:29
17 like thermal loaded, as well as yield of the lasers once 01:53:22	17 paragraph 38 So the patent has been cited in my 01:56:41
18 you put them down onto the boards. 01:53:28	18 declaration 01:56:47
19 These engineering considerations have to be taken 01:53:30	19 Q Right 01:56:47
20 into effect, and I don't believe I've been exposed to 01:53:33	20 But not cited to say that here's an example of a 01:56:48
21 all those details at this time. 01:53:36	21 well-known design consideration for automotive LiDARs; 01:56:53
22 Q Okay. In paragraph 32 of your declaration, you 01:53:39	22 is that fair? 01:56:57
23 say: Once Waymo had decided to develop a 64-laser 01:53:44	23 A Yeah, I think that's probably a fair comment, 01:56:58
24 LiDAR, its range of choices for how many transmit PCBs 01:53:49	24 looking at what I've written in paragraph 32 I do not 01:57:14
25 to use and how to distribute the laser diodes across the 01:53:53	25 go into details about well-known design considerations 01:57:22
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1 not be ideal for automotive LiDARs due to size 02:05:07	1 Q You have to account for with more boards? 02:08:01
2 considerations; correct? 02:05:11	2 A Well, physical alignment, and will the boards 02:08:03
3 A Size considerations is one of the issues if you 02:05:11	3 stay in alignment over the course of a lifetime of the 02:08:07
4 had 64 lasers on a board, but the other thing you would 02:05:16	4 LiDAR 02:08:10
5 have to be careful of is these laser are high-power 02:05:21	5 Q So in terms of the alignment, both physical and 02:08:10
6 lasers, and so there's going to be thermal effects, and 02:05:25	6 optical, more boards probably means more complexity? 02:08:13
7 the thermal effects will translate into board warpage, 02:05:28	7 A Well, the way I would look at this is if you have 02:08:18
8 and if the board warps, then everything goes out of 02:05:33	8 more boards, then your testing and alignment costs are 02:08:21
9 alignment, so not only is it a size issue, it's a 02:05:36	9 going to go higher If you have one board, your 02:08:26
10 thermal issue and, I would say, may even be a 02:05:38	10 alignment cost is going to go down, but then you have 02:08:29
11 manufacturing yield issue, because you are going to get 02:05:41	11 the problem of large size thermal loading and warpage of 02:08:32
12 64 lasers dye bonded to the board all perfectly, and 02:05:45	12 the board to go out of alignment 02:08:38
13 there is, you know, reasonable chance that one of them 02:05:49	13 So in both extremes, from an engineering 02:08:40
14 may not yield right, and that would add cost to the 02:05:51	14 standpoint, you may run into problems 02:08:43
15 board for rework. 02:05:55	15 Q Okay 02:08:45
16 Q Okay. So focusing just on size -- and that's 02:05:56	16 A Is it possible to take a break? 02:08:49
17 what I believe paragraph 33 of your declaration 02:06:10	17 Q Absolutely 02:08:51
18 addresses; right? I know you go on to mention thermal 02:06:14	18 THE VIDEOGRAPHER: It is 2:08 We are going off 02:08:52
19 considerations, but just looking at 33, you are talking 02:06:18	19 the record 02:08:55
20 about size? 02:06:20	20 (Recess taken) 02:08:55
21 A Yes -- well, I discuss in paragraph 33 -- size is 02:06:20	21 THE VIDEOGRAPHER: We are back on the record 02:19:55
22 certainly one of the parameters that has to be taken 02:06:29	22 It's 2:20 02:20:06
23 into account to design, let's call it, efficient LiDAR 02:06:31	23 BY MR NEWTON: 02:20:08
24 systems. 02:06:37	24 Q Dr Lebby, you also offered an opinion in 02:20:13
25 Q You say that use of larger PCB with numerous 02:06:38	25 paragraph 35 of your declaration that it is important to 02:20:16
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1 laser diodes would necessitate a larger LiDAR housing; 02:06:40	1 have an equal or approximately equal number of laser 02:20:18
2 is that right? 02:06:44	2 diodes per PCB to ensure an even -- even thermal load 02:20:19
3 A Well, yes, if you had larger boards, then the 02:06:44	3 across the PCBs; is that correct? 02:20:24
4 housing most likely would have to be bigger, but I can't 02:06:48	4 A Yes. 02:20:26
5 comment on that because I haven't really designed the 02:06:56	5 In paragraph 35, I'm indicating -- agreeing with 02:20:32
6 housing, and maybe there's some innovative way to -- 02:06:58	6 what Mr. Kits was saying in his declaration of making 02:20:35
7 to -- to deal with larger boards, but, generally 02:07:02	7 sure that you have a equal or uniform thermal load. 02:20:40
8 speaking, size would be an issue. 02:07:05	8 Q Is it fair to say that all -- 02:20:43
9 Q Is it fair, though, that if you had the same 02:07:08	9 (Discussion off the stenographic record.) 02:20:43
10 number of lasers and you wanted to put them on smaller 02:07:12	10 MR. NEWTON: I'll start over. 02:20:56
11 boards, you would need more boards? 02:07:15	11 Q All else being equal, is it fair to say that an 02:20:57
12 A Same number of lasers on smaller boards need more 02:07:18	12 eight-by-eight arrangement of laser diodes would have a 02:20:59
13 boards. So, yeah, that's -- hypothetically, you could 02:07:23	13 more even thermal load than a [REDACTED] 02:21:04
14 have 64 lasers on one board on one extreme. On the 02:07:26	14 arrangement of laser diodes? 02:21:06
15 other extreme, you could have 64 boards with each having 02:07:29	15 A I don't know the detailed answer to that question 02:21:07
16 one laser. 02:07:32	16 because I haven't looked at the engineering 02:21:13
17 Q So when you add more boards, your size is going 02:07:33	17 specifications for everything. 02:21:15
18 to increase in some dimension; fair? 02:07:36	18 Certainly we have to take into account the size 02:21:19
19 A Yeah, your -- if you have got 64 boards, yes, you 02:07:38	19 that is being allowed in the LiDAR to position all the 02:21:24
20 may have a size issue, but you also have -- probably 02:07:42	20 boards. I'm not clear -- it's not clear to me that 02:21:28
21 have a difficult alignment issue. Now you are aligning 02:07:45	21 there may be space for eight boards. I don't know the 02:21:30
22 64 boards as opposed to one board. That's optical 02:07:48	22 actual space -- the space availability in these designs, 02:21:34
23 alignment. 02:07:53	23 but what is really important is to make sure that you 02:21:42
24 Q And there's also a physical alignment; correct? 02:07:54	24 can fit the boards in in a reasonable size. You can 02:21:45
25 A Well, you have got -- 02:07:57	25 make sure that the design is what I would term is 02:21:52
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1 scalable, which means you can scale it in cost, so you	02:21:55	1 applications. It just talks about the technology that	02:24:19
2 don't actually increase the cost, but you can reduce the	02:21:59	2 is used in terms of packaging semiconductor lasers.	02:24:24
3 cost. You can maintain alignment, for example, and	02:22:01	3 Q And you -- I'm looking at paragraph 37 of your	02:24:27
4 that's making sure you have a thermal load.	02:22:04	4 declaration, which you might want to follow along with.	02:24:33
5 So whether that's eight or six or seven and a	02:22:07	5 You specifically cite Figure 5.5 of the Liu	02:24:37
6 half or five and a half, I don't know that answer, but I	02:22:10	6 textbook; correct?	02:24:44
7 think it's important to take into account that you want	02:22:13	7 A Yes, I have cited that figure.	02:24:45
8 to try and minimize your thermal load issues and your	02:22:15	8 Q Okay. And this shows a semiconductor laser stack	02:24:47
9 size issues when you come to your design.	02:22:20	9 that is composed of multiseiconductor laser bars	02:24:51
10 Q Okay. I'll just ask you, since we are on a clock	02:22:22	10 arranged vertically?	02:24:54
11 here and we have a limited amount of time, if you could	02:22:29	11 A That is correct; although, I would note, on	02:24:58
12 try to answer my questions specifically. If you can't,	02:22:32	12 line 22 of page 9, I do not call out a laser stack of	02:25:02
13 of course, I understand.	02:22:34	13 bars, but I use the word three "boards," but I believe	02:25:07
14 But just so we are clear, my question was: All	02:22:35	14 that you are probably more correct.	02:25:12
15 else being equal, an eight-by-eight arrangement of laser	02:22:38	15 Q Okay. "Boards" was your term, not the term from	02:25:14
16 diodes would have a more even thermal diode than a	02:22:41	16 the Liu textbook?	02:25:17
17 arrangement, and with the	02:22:45	17 A "Board" was my term.	02:25:19
18 information, you can't give a "yes" or "no" answer to	02:22:49	18 Q Okay. And laser bars, am I correct that they are	02:25:21
19 that; is that fair?	02:22:52	19 strips of multiple emitters on a common heat sink that	02:25:26
20 A I can't give an answer because I don't have the	02:22:53	20 are all packaged together?	02:25:31
21 details.	02:22:57	21 A Yeah. Laser bar is -- is a single piece of	02:25:32
22 When you say "everything being equal," I don't	02:22:59	22 semiconductor.	02:25:35
23 know what "everything" is, so I can't really give you a	02:23:01	23 In this case, the laser bars are showing ten --	02:25:36
24 categorical answer there.	02:23:05	24 ten emitters, and it would probably have ten stripes,	02:25:40
25 //	02:23:05	25 and they are not singulated, so they are not individual	02:25:43
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1 (Exhibit 33 was marked for	02:23:05	1 lasers.	02:25:46
2 identification by the Court Reporter.)	02:23:05	2 Q And the LiDAR systems that we have talked about	02:25:47
3 BY MR. NEWTON:	02:23:05	3 in this case use singulated emitters; correct?	02:25:50
4 Q Okay. I've handed you Exhibit No. 33, and this	02:23:06	4 A Yes. They use singulated emitters.	02:25:55
5 was Exhibit 4 to your declaration. It's a textbook	02:23:15	5 I think I saw, in one of the documents, that the	02:26:00
6 authored by Xingsheng Liu; is that correct?	02:23:18	6 emitter is composed of laser-emitting chips. I	02:26:05
7 And I should mention this is an excerpt from the	02:23:22	7 haven't seen, in detail, what they look like, but this	02:26:11
8 textbook.	02:23:25	8 example here just shows you that you could have a laser	02:26:14
9 A Yes, it is.	02:23:25	9 bar with ten laser diode outputs.	02:26:17
10 Q The title of the textbook is "Packaging of High	02:23:26	10 Q You agree with me that Figure 5 is -- is it fair	02:26:20
11 Power Semiconductor Lasers"?	02:23:29	11 to say it's kind of a crude representation of the laser	02:26:38
12 A That is correct.	02:23:30	12 stack -- laser bar stack?	02:26:41
13 Q What does "packaging" refer to in that title?	02:23:31	13 A When you say "crude," yeah, there's not a lot of	02:26:42
14 A "Packaging" is usually the process of making	02:23:38	14 details in Figure 5.5. It just shows three substrates	02:26:48
15 outside connections to a semiconductor chip. It doesn't	02:23:43	15 mounted on top of each other with laser bars mounted on	02:26:52
16 have to be a semiconductor chip, but it's usually	02:23:51	16 the substrate and the -- what would look like the	02:26:55
17 something that emits or detects light in this case.	02:23:53	17 emitted laser beam from each of the output emitters.	02:26:59
18 Packaging usually allows both optical and electrical	02:23:56	18 Q And do you agree that the number of emitters on a	02:27:03
19 connections to the outside world.	02:23:59	19 semiconductor laser bar range from 19 to 69, typically?	02:27:06
20 Q Okay. And this textbook is not specific to	02:24:01	20 A The number of emitters on a laser bar range from	02:27:12
21 LiDAR; is that correct?	02:24:03	21 19 to 69. I'm not sure I understand the question.	02:27:24
22 A That is correct.	02:24:04	22 Q So a laser bar typically has a number of laser	02:27:27
23 Q And the textbook does not describe any specific	02:24:05	23 emitters on it; correct?	02:27:32
24 LiDAR applications; is that correct?	02:24:11	24 A Yes.	02:27:34
25 A I don't believe the textbook discusses LiDAR	02:24:12	25 Q Not just one, but multiple?	02:27:35
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1 [REDACTED] ?	02:34:10	1 A Oh, Figure 7.51 [sic]?	02:37:28
2 A I see that.	02:34:12	2 Q Yes.	02:37:30
3 Q Am I correct that you do not dispute that the	02:34:13	3 A Yes, I've got that in front of me.	02:37:31
4 Fuji device includes a transmit block with a plurality	02:34:18	4 Q And Liu also includes a Figure 7.5.0?	02:37:33
5 of laser diodes mounted on [REDACTED] with [REDACTED]	02:34:21	5 A That is correct.	02:37:36
6 [REDACTED]	02:34:27	6 Q And that's not cited in your declaration? I	02:37:37
7 A So I have heard this from Mr. Haslim in my	02:34:30	7 should say, the figure itself is not included in your	02:37:47
8 video-call discussion with him, because I asked him the	02:34:37	8 declaration?	02:37:49
9 question, though I have not actually seen a board or a	02:34:39	9 A Yeah, I think I just cited the Liu textbook	02:37:49
10 laser package in -- in real life, only from a	02:34:42	10 page 224.	02:37:53
11 photograph, which I've used in my document, and the	02:34:47	11 Q You don't discuss Figure 7.5.0 in your	02:37:54
12 resolution of which is -- doesn't allow me to take a	02:34:50	12 declaration?	02:37:57
13 close look at the situation.	02:34:53	13 A That is correct.	02:37:57
14 Q So you did not offer an opinion as to whether	02:34:54	14 Q And figure -- page 224 of the Liu textbook, along	02:38:01
15 this design is present or not in the Fuji device?	02:34:58	15 with Figure 7.5.0 and 7.5.1, this material is not in the	02:38:13
16 A It's my understanding that the laser diodes used	02:35:02	16 context of LiDAR; correct?	02:38:19
17 in the Fuji system are [REDACTED], from my discussion with	02:35:08	17 A Well, what we are looking at here is the	02:38:20
18 Mr. Haslim.	02:35:12	18 placement of laser diodes.	02:38:26
19 Q Did he tell you [REDACTED] ?	02:35:12	19 Q So my question, Dr. Lebby, was just: Is it in	02:38:28
20 A I believe he may have said [REDACTED] but	02:35:14	20 the context of LiDAR specifically?	02:38:31
21 I can't be quoted on that because that number did come	02:35:22	21 A Well, this is in the context of packaging laser	02:38:33
22 up, and I wasn't sure if it related to [REDACTED]	02:35:26	22 diodes in high-power environment, and LiDAR uses	02:38:37
23 [REDACTED]	02:35:30	23 high-power laser diodes, so I would agree with you that	02:38:41
24 Q Is it correct that the only LiDAR devices with	02:35:33	24 LiDAR is not noted in the book, but I have to observe	02:38:46
25 [REDACTED] that are identified in your	02:35:37	25 that LiDAR uses high-power laser diodes in a similar	02:38:50
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1 declaration are Waymo's devices and the Uber Fuji	02:35:40	1 fashion.	02:38:54
2 device?	02:35:44	2 Q So page 224 of the Liu textbook, you would agree,	02:38:55
3 A Well, I haven't done a industrial review of LiDAR	02:35:44	3 is not discussing LiDAR specifically; is that fair?	02:39:02
4 devices, so what I can say is that, from the documents	02:35:52	4 A Well, it's -- it's discussing -- it's discussing	02:39:05
5 I've read, the Waymo device uses [REDACTED], and on	02:35:57	5 the packaging of high-power semiconductor lasers are	02:39:09
6 the Fuji device, from what I've been told -- and I	02:36:03	6 used in LiDAR, but it does not, agree with you, call out	02:39:12
7 haven't actually seen the board in detail -- that Fuji	02:36:06	7 LiDAR specifically.	02:39:17
8 device also uses [REDACTED] diodes. I don't know if any	02:36:09	8 Q It doesn't say use these designs in a LiDAR	02:39:17
9 other laser -- LiDAR unit uses [REDACTED] at this	02:36:13	9 system?	02:39:20
10 point.	02:36:18	10 A This book -- the context of this book is -- is	02:39:20
11 Q So you didn't identify any others besides the	02:36:18	11 the packaging of the lasers, not the applications, so I	02:39:24
12 Waymo and Fuji device in your declaration?	02:36:21	12 would agree with you that LiDAR is not called out or	02:39:28
13 A I didn't identify any others because I haven't	02:36:22	13 mentioned.	02:39:30
14 done analysis.	02:36:27	14 Q And I believe you say that a known disadvantage	02:39:31
15 Q Paragraph 49 of your declaration, you cite the	02:36:28	15 of [REDACTED] is an effective heat	02:39:36
16 Liu textbook again; is that correct?	02:36:37	16 conduction; correct?	02:39:41
17 A Yes.	02:36:39	17 A That is correct.	02:39:41
18 Q Okay. And I believe you cite page 224 of the Liu	02:36:41	18 Q And you agree with me that heat conduction and	02:39:42
19 textbook?	02:36:57	19 other thermal considerations are important for	02:39:46
20 A Yes, I have it in front of me.	02:36:58	20 high-powered laser diode applications?	02:39:48
21 Q And your declaration at paragraph 49 includes	02:37:00	21 A I would go further to say that heat conduction is	02:39:50
22 Figure 7.5.1 from Liu; correct?	02:37:09	22 important for all semiconductor diode lasers.	02:39:54
23 A Could you tell me where you get 7.5.1?	02:37:12	23 Q And then the -- I believe you also said the	02:39:56
24 Q You might have to cross-reference it with the --	02:37:22	24 downside of underhanging laser diodes is potential	02:40:00
25 the Liu text itself.	02:37:25	25 blockage of emitted light?	02:40:03
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1 A If I remember correctly, my understanding of the 02:46:37	1 note, that I did not cite in my report because I 02:49:53
2 trade secret is [REDACTED] 02:46:41	2 forgot -- let's see. The -- from line -- column 3, 02:49:57
3 [REDACTED] 02:46:45	3 line 10 to 16 talks about the alignment of photodiodes 02:50:05
4 [REDACTED] 02:46:50	4 towards the hole. I can read it if you wish. 02:50:11
5 Q So it's your understanding of the trade secret 02:46:54	5 Q No, that's okay. 02:50:13
6 [REDACTED] 02:46:56	6 Did you understand my question? 02:50:14
7 [REDACTED] 02:47:01	7 A Well, your question is, is the patent is -- 02:50:17
8 [REDACTED] 02:47:06	8 teaches [REDACTED] and what I'm 02:50:20
9 A No. No. That's not exactly what I'm trying to 02:47:08	9 suggesting is that the patent, if you look at column 3, 02:50:23
10 say. 02:47:11	10 actually does more than that. It actually teaches the 02:50:26
11 What I'm trying to say is you have two parts to 02:47:11	11 [REDACTED] 02:50:30
12 this trade secret, is the best of my understanding. The 02:47:14	12 [REDACTED] 02:50:35
13 first part is [REDACTED] 02:47:17	13 [REDACTED] 02:50:38
14 [REDACTED] is 02:47:23	14 MR. NEWTON: I'll move to strike that response as 02:50:41
15 the first part. And the second part is -- [REDACTED] 02:47:28	15 nonresponsive and outside the scope of your declaration. 02:50:44
16 [REDACTED] 02:47:33	16 Q My question was simply that this patent does not 02:50:47
17 [REDACTED] 02:47:36	17 deal with [REDACTED] 02:50:51
18 Q And do you agree that the trade secret also 02:47:36	18 [REDACTED]. It's just a single printed circuit board; 02:50:53
19 includes the [REDACTED] 02:47:39	19 correct? 02:50:56
20 A I'm not sure I understand that -- that question, 02:47:42	20 A I believe there are two boards that are aligned 02:50:56
21 other than the fact that [REDACTED] 02:47:57	21 together here, and I believe that this patent teaches 02:51:00
22 [REDACTED] 02:48:01	22 the alignment of photodiodes to the board using the pin 02:51:05
23 [REDACTED] 02:48:05	23 as the source. 02:51:08
24 [REDACTED] 02:48:09	24 MR. NEWTON: Okay. I'll move to strike that as 02:51:11
25 [REDACTED] 02:48:14	25 well. 02:51:13
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1 Q Okay. In paragraph 53, you say: The concept of 02:48:14	1 Q If you look at Figure 3, that shows just a single 02:51:13
2 [REDACTED] has been 02:48:22	2 printed circuit board; correct, labeled 10? 02:51:16
3 known to the public since at least the 1970s, and you 02:48:24	3 A Figure 3 shows a number of things here. 02:51:23
4 cite U.S. Patent No. 4,244,109? 02:48:28	4 No. 10 -- 02:51:46
5 A Yes, I do. 02:48:33	5 Q Dr. Lebby, I'm sorry, just, again, in the 02:51:46
6 Q I've marked that patent as Exhibit No. 35, which 02:48:33	6 interest of time, if you could answer my question as 02:51:49
7 is in front of you. 02:48:38	7 I've asked it, and I don't think the question was 02:51:51
8 (Exhibit 35 was marked for 02:48:40	8 complicated. 02:51:54
9 identification by the Court Reporter.) 02:48:49	9 I just said, if you look at Figure 3, it shows a 02:51:54
10 BY MR. NEWTON: 02:48:49	10 single printed circuit board labeled No. 10; correct? 02:51:57
11 Q And the '109 patent is directed to a read/write 02:48:51	11 A Figure 3 shows a printed circuit board 10, plus a 02:51:59
12 head and a magnetic disk data storage system. 02:48:57	12 alignment of a plate, which is aligned to the printed 02:52:04
13 Does that sound correct? 02:49:01	13 circuit board, which I'm looking for the number and I 02:52:07
14 A Yes. In the "Background of the Invention," the 02:49:02	14 can't find it. 02:52:09
15 '109 patent does talk about that as the application. 02:49:04	15 Q Okay. So you agree that Figure 3 shows only one 02:52:10
16 Q So it's not in the field of LiDAR? 02:49:07	16 printed circuit board, "yes" or "no"? 02:52:13
17 A I would agree that the patent is written towards 02:49:12	17 A Let me just check what No. 14 is. 02:52:17
18 optical storage. 02:49:15	18 It certainly looks like Figure 3 has one printed 02:52:35
19 Q And the '109 patent does not deal with [REDACTED] 02:49:16	19 circuit board labeled 10. 02:52:38
20 [REDACTED] correct? 02:49:25	20 Q And paragraph 53 of your declaration does not 02:52:39
21 A If you look at the sections I've cited in 02:49:26	21 describe more than one printed circuit board; correct? 02:52:52
22 column 1 -- 189, that talks about the aligning of the 02:49:32	22 A Paragraph 53 discusses the concept of using holes 02:52:55
23 printed circuit board, and 163 talks about having a 02:49:38	23 to align printed circuit boards, and I've just given you 02:53:05
24 cylindrical pin for the alignment. 02:49:47	24 one patent, which is patent '109, that shows that you 02:53:07
25 But if you also look at column 3, which, I might 02:49:50	25 can align components on a printed circuit board that's 02:53:12
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1 actually sourced to a pin to do it -- to align the board 02:53:14	1 abstract to say that [REDACTED] 02:56:22
2 to a glass plate, and there was a glass plate and a 02:53:17	2 [REDACTED] 02:56:25
3 board, and the components were all aligned based to the 02:53:23	3 A Well, you talk about [REDACTED] 02:56:26
4 pin. 02:53:25	4 [REDACTED] 02:56:29
5 Q Okay. So in your description of the '109 patent 02:53:25	5 [REDACTED] 02:56:33
6 in paragraph 53, you only mention the one PCB that's 02:53:28	6 Q So it's your opinion that this patent discloses 02:56:34
7 disclosed in that patent; correct? 02:53:31	7 [REDACTED] 02:56:38
8 A Yes, that's correct. 02:53:32	8 [REDACTED] 02:56:42
9 Q And paragraph 54 of your declaration cites a 02:53:51	9 [REDACTED] 02:56:44
10 German patent from 1980? 02:53:55	10 A It's my understanding this patent teaches that 02:56:44
11 A That is correct. 02:53:58	11 [REDACTED] 02:56:49
12 Q It's actually a patent application; correct? 02:53:59	12 [REDACTED] 02:56:51
13 A I take it that's Exhibit 36? 02:54:05	13 Q And that's the -- 02:56:54
14 Q That's correct. Exhibit 36 was Exhibit 7 to your 02:54:13	14 A I believe the patent doesn't talk about the stack 02:56:55
15 declaration, I believe. 02:54:18	15 per se, but it talks about the process of putting a 02:57:00
16 (Exhibit 36 was marked for 02:54:20	16 reference hole or an accurately located hole into 02:57:03
17 identification by the Court Reporter.) 02:54:21	17 printed board so that [REDACTED] 02:57:06
18 THE WITNESS: I'm not sure if it's patent 02:54:21	18 [REDACTED] 02:57:09
19 application or not, but certainly it's a German patent, 02:54:25	19 Q Okay. And, again, you didn't cite the figures 02:57:09
20 and I've cited the abstract of this patent. 02:54:30	20 from this patent as part of your declaration? 02:57:13
21 BY MR. NEWTON: 02:54:32	21 A I didn't cite the figures because I haven't seen 02:57:16
22 Q And the version of it that you have attached to 02:54:37	22 the figures and I couldn't find the figures. 02:57:18
23 your declaration is -- looks like an English 02:54:39	23 Q You looked for them? 02:57:20
24 translation; correct? 02:54:41	24 A I tried. 02:57:21
25 A Yes, I believe there's English and German. 02:54:42	25 Q And it's not your opinion that this German patent 02:57:22
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1 Q Doesn't have any figures in it, does it? 02:54:45	1 is in the field of LiDAR; correct? 02:57:31
2 A That is correct. 02:54:47	2 A Well, the patent doesn't teach the use of these 02:57:33
3 Q And in paragraph 54, you describe the German 02:54:48	3 boards in LiDAR, but boards, as we know, are used in 02:57:39
4 patent as describing board holes that all have an exact 02:55:00	4 LiDAR, so -- but it doesn't explicitly talk about LiDAR 02:57:43
5 relative position to one another; correct? 02:55:05	5 It talks about printed circuit boards 02:57:46
6 A Correct. 02:55:07	6 Q And the portion of the -- or, I should say, the 02:57:48
7 Q And the board holes are not [REDACTED] 02:55:08	7 German patent, it's not your opinion that it describes 02:57:53
8 [REDACTED] correct? 02:55:15	8 [REDACTED] 02:57:56
9 A That I'm not sure about, because the abstract 02:55:16	9 [REDACTED] 02:57:59
10 talks about boards in a stack, so I would presume that 02:55:25	10 A It's my understanding this patent doesn't discuss 02:58:00
11 these are boards aligned in a stack using a reference 02:55:29	11 [REDACTED] 02:58:04
12 hole to align those boards. 02:55:33	12 Q Does it discuss [REDACTED] 02:58:09
13 Q But the abstract also discusses the board holes 02:55:34	13 A Just give me 30 seconds 02:58:12
14 as being positioned over a salter boss [phonetic]; 02:55:38	14 I believe [REDACTED] are not mentioned in this patent 02:59:22
15 correct? 02:55:42	15 MR. NEWTON: Okay Can we take a break real 02:59:24
16 A That is correct. 02:55:42	16 quick? 02:59:26
17 Q So if each hole is positioned over a salter boss, 02:55:53	17 THE VIDEOGRAPHER: Yeah I've got to change the 02:59:27
18 then the holes are not going to be positioned over each 02:56:03	18 disc, so -- 02:59:27
19 other? 02:56:06	19 MR. NEWTON: Okay 02:59:27
20 A Well, the design of the patent is to certainly 02:56:06	20 THE VIDEOGRAPHER: -- that will work out 02:59:27
21 make holes in the printed circuit board so they could be 02:56:08	21 This is the end of Disc 1 in Volume 1 in the 02:59:29
22 used in a stack minus, then, in a stack is a stack of 02:56:11	22 deposition of Dr. Lebby It is 2:59 02:59:31
23 printed circuit boards that are aligned to the holes. 02:56:16	23 (Recess taken) 02:59:35
24 Q Right. 02:56:18	24 THE VIDEOGRAPHER: We are back on the record 03:05:16
25 But there's not enough description in that 02:56:19	25 This is the beginning of Disc 2 in Volume 1 in 03:05:27
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1 the deposition of Dr. Lebby. It's 3:05. 03:05:31	1 LiDAR system; correct? 03:08:02
2 (Exhibit 37 was marked for 03:05:31	2 A I cited these references to show that industry 03:08:03
3 identification by the Court Reporter.) 03:05:33	3 technology is out there and in public that addresses 03:08:07
4 BY MR. NEWTON: 03:05:33	4 some of the trade secrets that I read in the Jaffe 03:08:12
5 Q Okay. Dr. Lebby, if you go to Exhibit No. 37, 03:05:34	5 Exhibit 1 document. 03:08:17
6 Deposition Exhibit No. 37, which is Exhibit No. 8 to 03:05:38	6 Q You did not cite them to show that Uber used 03:08:17
7 your declaration. 03:05:42	7 these references or these teachings to develop its 03:08:20
8 Do you recognize this as the '037 patent? 03:05:44	8 system; correct? 03:08:23
9 A Yes, I recognize it. 03:05:46	9 A These references were cited to show 03:08:24
10 Q And this is directed to a multilayer printed 03:05:47	10 state-of-the-art in technology of printed circuit boards 03:08:28
11 circuit board? 03:05:50	11 and -- and recent placement in alignment, things like 03:08:32
12 A That is correct. 03:05:51	12 [REDACTED] That -- that's the only reason I cited them. 03:08:35
13 Q And that's just a single printed circuit board, 03:05:51	13 Q Okay. So the answer to my question is "correct"? 03:08:39
14 not multiple printed circuit boards? 03:05:55	14 A I did not use these references to show anything 03:08:44
15 A I believe this is a single printed circuit board. 03:05:56	15 about Uber, just where the technology is in the -- from 03:08:47
16 Q And this is -- patent is not in the field of 03:06:01	16 an experienced engineer. 03:08:53
17 LiDAR; correct? 03:06:05	17 Q Okay. If you go to paragraph 59 of your 03:08:54
18 A The patent doesn't mention LiDAR at all. It just 03:06:05	18 declaration here, you discuss Trade Secret Nos. 94 to 03:08:58
19 talks about the process to drill holes into a printed 03:06:15	19 99? 03:09:08
20 circuit board and position hidden conductive layers. 03:06:18	20 A Yes, I see that. 03:09:08
21 Q Okay. And it doesn't talk about [REDACTED] 03:06:22	21 Q And these trade secret numbers refer to the PCB 03:09:12
22 [REDACTED] 03:06:25	22 design schematics and layouts for the transmit boards in 03:09:20
23 [REDACTED] correct? 03:06:29	23 Waymo's GBR3 LiDAR device? 03:09:24
24 A That's my understanding of this patent. Doesn't 03:06:30	24 A That is correct. 03:09:26
25 discuss [REDACTED] 03:06:33	25 Q And we talked earlier about your materials 03:09:27
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1 [REDACTED] 03:06:37	1 considered. 03:09:29
2 [REDACTED] 03:06:41	2 You didn't consider these specific design files 03:09:29
3 but they are not directly called out in this patent. 03:06:44	3 as part of your declaration; correct? 03:09:31
4 Q And so we have looked at the Liu textbook, the 03:06:47	4 A I only considered what was shown to me in the 03:09:33
5 Scholz dissertation, the '109 patent, the German patent, 03:06:54	5 exhibits, and I think they were the Jaffe exhibits. 03:09:38
6 and the '037 patent, and you haven't cited any evidence 03:06:59	6 Q Okay. You didn't look at the native versions of 03:09:41
7 in your declaration that someone has actually taken the 03:07:04	7 the design files, for example? 03:09:45
8 teachings of these references and applied them to LiDAR; 03:07:07	8 A That is correct. 03:09:46
9 correct? And I'm just asking what you have cited in 03:07:13	9 Q And you didn't offer an opinion about whether 03:09:46
10 your declaration. 03:07:15	10 these files themselves are trade secrets; correct? 03:09:56
11 A Yeah, what I've cited in my declaration is 03:07:16	11 A I never looked. It wasn't part of my remit to 03:09:59
12 technologies that are common to myself as an experienced 03:07:20	12 look at native files, so I haven't offered any opinions. 03:10:04
13 person in the field where -- 03:07:24	13 Q And do you agree with me, generally, that, you 03:10:08
14 Q And, I'm sorry, Dr. Lebby, to cut you off, I'm 03:07:27	14 know, based on your experience that a company's design 03:10:12
15 just really under the clock here. 03:07:29	15 files can be trade secrets and include trade secret 03:10:15
16 I just -- if you can answer them "yes" or "no," 03:07:31	16 information? 03:10:19
17 you don't cite any evidence in your declaration of 03:07:33	17 A It depends. 03:10:19
18 someone taking these references and applying their 03:07:35	18 Also, from my experience with trade secrets is 03:10:24
19 teachings to LiDAR? 03:07:38	19 that you have got to have very clear specificity of your 03:10:27
20 A I have not observed any of these references 03:07:40	20 trade secret. I guess it could be in -- trade design 03:10:31
21 directly, either being taught or mentioned in LiDAR, but 03:07:44	21 files could be included in that. 03:10:35
22 the technologies within these references are certainly 03:07:49	22 Q And you understand, as part of this case, Waymo 03:10:36
23 something that could be used in LiDAR. 03:07:52	23 has alleged that Anthony Levandowski stole 14,000 files 03:10:42
24 Q Okay. And it's not your opinion that Uber took 03:07:53	24 related to Waymo's LiDAR systems? 03:10:47
25 these references and used them as a guide to develop its 03:07:57	25 A I have certainly read that in some of the 03:10:50
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